

balancing news

Information for the quality and performance of rotating equipment - From Schenck Trebel Corporation.

Corporate Change is a Prerequisite for Continuous Success

by Bertram Dittmar, President and CEO

For the vast majority of manufacturers and overhaulers of rotating machinery worldwide the name Schenck is a synonym for balancing. From toolholders to gas turbines, from crankshafts to electric motors, every conceivable type of rotor is balanced on Schenck equipment. We at Schenck Trebel Corporation, and at our sister company Schenck Turner Inc., are proud to build high quality machines and systems, and to provide outstanding service to our customers in the Americas.

Schenck Trebel Corporation's parent company, Schenck RoTec, the German balancing giant, has global market presence through its manufacturing plants and sales and service offices in numerous countries around the globe.

Since April 2000, Schenck is a member of the Dürr group, the leading global provider of technologies and services, focusing on efficient manufacturing in the automotive industry.

One of the challenges of any corporation in today's business environment is the combination of the flexibility needed to satisfy individual or regional customer requirements, and the solidity and product quality embedded in a traditional corporate climate. Our customer base is extremely diversified: many of our customers are large global organizations, others through mergers, acquisitions or internal growth, have recently become global operations and manufacture their products in different regions of the world, while others seek their success in local or regional markets.

In the late 90's it was apparent that Schenck RoTec had become too large to remain flexible enough to satisfy all of its customers' requirements. A reorganization of Schenck RoTec created smaller, faster acting and more focused Business Units with global responsibilities.

At the same time, our relationship with Schenck Vibro was changing as well. This group, which was also a division of Carl Schenck AG, consolidated their interests and merged with Bruel & Kjaer to form Bruel & Kjaer, Schenck Condition Monitoring Systems. As a result of this merger, B&K,S is now one of the largest and most comprehensive providers of predictive and preventive maintenance equipment in the world.

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VibroTest 60 News...

New 'balancing expert' module makes our Vibrotest 60 the perfect vibration analyzer and field balancer!



by Leo Milito
Sales Engineer

When we introduced our Vibrotest 60, we were excited about its features and capabilities as an off-line analyzer. Since then, this handy two-channel unit has proved itself as the ideal measuring device for machine maintenance, service and testing.


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STC to Offer Laser Alignment Systems...



by Roland Kewitsch,
Product Manager — Vibration Equipment

Schenck Trebel has signed an agreement with HAMAR LASER Instruments of Danbury, Connecticut to sell their Coupling and Sheave Laser Alignment Systems — read about it on the next page...

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Schenck Trebel To Offer Laser Alignment Systems

Roland Kewitsch,
Product Manager — Vibration Equipment

HAMAR LASER is on the cutting edge of laser alignment technology as evidenced by their S-650 and S-600 alignment systems. HAMAR LASER has the system integration and innovation that complements our Vibrotest 60 portable vibration analyzer. This makes the VT60 and S-650 combination the ideal solution for all alignment, analysis and field balancing applications.

The S-650 Coupling Alignment System is the newest alignment system on the market today. The S-650 is a



5-axis live system with color graphics and infrared communications, which eliminates the need for bulky cables and has a range of over 20 feet. The S-650 is lightweight, easy to set up and use. The S-650 uses 2 laser beams, one for angular offset, and the other for centering, making the system highly accurate. The system can

be used in bright sunlight due to a backlight elimination routine in the system. A built-in light meter gives you the quality of the laser signal received. A blue indicator is used for too little light, green for acceptable range, yellow for marginal, and red for out of specification. System tolerance limits can be preset to your particular needs quickly and easily. Thermal growth can also be taken into account as an offset. Reversible clamps with speed nuts allow for fast setup of the laser and target. The clamps can accept shafts from 3/8" to 18" in diameter with the use of an additional chain set. All components are compact and lightweight making field alignments easier and less time consuming. Alignments can be done up to 75% faster than previous systems resulting in less system down time and less cost.

Initial machine setup requires inputting of the system information, coupling to target distance, target to front foot, front to rear foot, left to right foot and coupling diameter and any thermal growth offsets. The laser and target are then aligned for optimum efficiency. A soft foot check is done prior to alignment to confirm system stability. The shaft is then rotated a minimum of 45 degrees (best results are with at least 180 degrees rotation). Readings are transferred at the rate of up to 15 times per second, providing a high degree of angular accuracy. **The software automatically calculates** the horizontal and vertical offset and the amount of shim required to bring the system into alignment. As you make your move, the graphic screen updates and shows you immediately the effects of your alignment. When the horizontal or vertical readings are within the tolerance you have specified, the color bar for the axis will change from red to green. The graphic

can be "flipped" to give you a true visual representation of the system you are aligning. The zoom feature also allows for finer adjustments by expanding the graphic range.

By aligning your pumps, motors and other rotating machinery, you will notice a reduction in your energy costs as well as **reduced mechanical wear and tear on the machine**. Depending on your needs a standard laptop computer or a Tough Book computer can also be



provided with your system.

The S-600V Sheave Alignment System is a true groove-to-groove alignment setup. Adjustable clamps attach the laser and target to the sheaves, eliminating

the need for magnets or ferrous-based sheaves. The S-600V does not use the sheave face for alignment, as the face may not be parallel to the grooves. A standard set of 1/2" precision ball blocks accommodate a wide variety of sheave grooves. The S-600V can be used on both classic and narrow V-belt sheaves.

We are pleased to announce that Schenck Trebel has signed an agreement with HAMAR LASER Instruments of Danbury, Connecticut to sell their Coupling and Sheave Laser alignment systems.

Easy to setup and use, just clamp the laser and visual target to the sheaves, and make them roughly parallel, and you are ready to begin alignment. **No**

complicated setup or difficult calculations to perform. A maximum distance of up to 15 feet between sheaves is possible. A quick calculation based on visual markings and the distance between the feet of the unit provides the amount of shim required for pitch correction. A mirror reflects the laser beam and thus provides the angular offset measurement. The position of the laser beam on the target shows the groove alignment.

By aligning the sheaves you correct the pitch, yaw and groove alignment, providing full driving torque from the drive belts. This reduces excessive groove, belt wear and system vibrations, and it increases the life of bearings, seals and other machine components. In grinding and metal cutting applications these vibrations reduce the quality of the machining process and increase rejection rates. By aligning these systems, the results are **less machine downtime, less material replacement costs, lower rejection rates and reduced labor and energy costs**. The S-600V is easily upgradeable to a digital system with the addition of a target and readout and is battery powered for portability.

Changes and Improvements for Customer Support Services...

Joseph R. Murray, P.E.

Manager Customer Support Services

As the fast pace of today's business world increases, Customer Support Services must constantly find ways to improve our responsiveness to Schenck Trebel customers. One way is to improve our efficiency by taking advantage of advances in computer technology.

Over the years, Schenck has accumulated vast databases of information about each piece of equipment built and the customers who have purchased them. Customer Support Services has further expanded these databases over the last year to include the following:

- **Service Reports:** Our field personnel can now write service reports on their laptop computers and upload them to our mainframe computer from the field. This makes these reports immediately available to personnel in our other departments (Sales, Applications, Engineering) for quick response to any pending issues. Archived service reports from the past 14 years can in turn be immediately accessed by our field personnel while in the field. This ensures that they have complete and up-to-date information regarding the history of any particular machine. This information includes past calibration constants and performance data, and is also available to customers upon request.
- **Telephone Archives:** Important telephone communications are now summarized and electronically filed with each machine history to initiate actions and for long-term archiving. This is especially important since the establishment of our new Help Desk.
- **Repair Tracking:** All in-house repairs, returns, and exchanges are now electronically tracked and also filed with each machine history. Before shipping any material to Schenck Trebel, be sure to first call us and get a Return Authorization Number (RA#). We will then pre-arrange receipt of the material, and it will be accurately tracked from the minute it is received by us. This means that in-house repairs are efficiently assigned and processed, with details of the problem immediately available to the repair technician. During and following the repair, relevant details are electronically archived with the machine history file. In the case of returns and exchanges, a pre-arranged RA# will ensure that your account is quickly credited.



- **Field Service Scheduling:** All field service work is now scheduled electronically, allowing details of the future or past visits to be quickly accessed by all Schenck Trebel personnel, including those in the field (via laptop/modem). This allows for more efficient scheduling, which translates to decreased travel expenses to customers. This also facilitates better coordination between Schenck Trebel personnel.

Another advantage to the new scheduling system is that it allows pre-scheduling of preventive maintenance and calibration visits years in advance. This has led us to now offer Automatic Calibration Scheduling Service. With this service, available to all Schenck Trebel customers, Schenck will track your equipment calibration schedule for you. This eliminates missed calibration deadlines and avoids unplanned downtime on your equipment. In addition, all participants of our Automatic Calibration Scheduling Service receive a substantial discount off standard service rates. Contact our Customer Support Services department for details.

Also due to the new scheduling system, it's easier to reassign personnel from outside our normal pool when needed for emergency situations. Details on this service option are also available from our Customer Support Services department. Ask about "Rapid Response Service."

As always, we are constantly on the lookout for new ways to improve our response to customer needs, and welcome any comments or suggestions from you.

Continued from page 1...

New 'Balancing Expert' Module VIBROTEST 60

The Perfect Vibration Analyzer & Field Balancer!

by Leo Milito — Sales Engineer

The new Balancing Expert Module 7 brings field balancing to a new level. This upgrade permits balancing in single plane, dual plane and 1-2 plane with prognosis. The Vibrotest 60's light weight (under 2 pounds) and compact design makes field balancing fast, easy and affordable.

Field balancing with the Vibrotest 60 is as easy as one, two, three. First turn on the machine and wait for it to reach operating speed. Start the Vibrotest 60 and take the "Initial Run" data. Shut down the machine. Next, place your test mass on one plane of the machine to be

We are proud to announce: Our new Balancing Expert Module is available as an additional option for new instruments or as an upgrade to an existing unit. Field balancing helps to reduce machine down time, wear-and-tear on bearings, seals and other mechanical parts for an overall cost savings.



Plane A	
Test Run A	
8.36 mm/s rms	166°
2985 rpm	
TMA + 150.0 g	Loc 0°
Remove Trial Weight ?	
START	YES NO EDIT

Figure 1

Plane A	
1 Plane Balancing	
IR 6.34 mm/s	79°
TRA 8.36 mm/s	166°
CMA + 11.11 g	Loc 211°
CR 0.85 mm/s	232°
2985 rpm	
ADD CR=IR RESET	

Figure 2

Plane A	
2 Plane Balancing	
IR 10.49 mm/s	16°
TRA 7.84 mm/s	103°
TRB 8.09 mm/s	56°
CMA + 17.72 g	120°
CMB + 0.74 g	166°
CR 1.25 mm/s	36°
1489 rpm	
ADD CR=IR RESET	

Figure 3

balanced and restart the machine. Take the "Trial mass #1" data (Figure 1).

Shut down the machine, remove the test mass and place it on the second plane of the machine. Restart the machine and take the "trial mass #2" data (Figure 2).

If the results show a single plane balance problem, then the Vibrotest 60 will automatically default to single plane balancing and give the operator a message to that effect. The Vibrotest 60 will now calculate correction masses for both plane 1 and plane 2.

The second channel correction mass data can be displayed by pressing the 1/2 key on the Vibrotest 60. Now perform a check run to verify vibration levels. Typically, vibration levels will drop to less than 10% of original readings.

If additional reduction is required you can bypass the initial run by pressing the "CR=IR" key and continue from the trial mass point of the balancing (Figure 3).



Balancing with the Vibrotest 60 is fast, easy and accurate. For more information, request a copy of our new BBF 0009-US brochure.

Corporate Change...

We at Schenck Trebel have since made adjustments within our organization with regard to both product groups in order to reach our goals and exceed all our customers' expectations, regardless of their size or location:

- We have strengthened our service organization with more personnel, and cross-training in balancing and vibration monitoring.
- We focus even more than before on providing complete solutions to our customers, including knowledge transfer, training, products, services and consulting.
- We provide gas turbine balancing seminars for specific engines - worldwide.
- We exchange information and customers needs and wants with other Schenck facilities worldwide to provide the right products and services wherever they are needed.
- We service our equipment worldwide through Schenck's global organizations.
- We supply spare parts and wear and tear parts for all our products. If an order is received before 2:00 p.m., we ship parts from stock the same day.
- We have established a "Help Desk" to answer customers' questions, regardless whether they are application related or service related.

In complementation of our complete line of balancing products and services as well as vibration analysis and monitoring products, Schenck Trebel now also offers a complete line of laser alignment equipment.

Continuous change in a corporation is a necessity, not an option. Whether change affects internal processes, product development or business models, everyone must understand one thing: Standstill means to step backwards -business success requires readiness and willingness to change.

For us at STC, the process of change has given us an opportunity to re-examine the way that we conduct ourselves as a company, and provide our products and services to you as our customers. I am sure that you will share our enthusiasm as these changes become apparent to you in the weeks and months to come.



Bertram Dittmar, President and CEO

Balancing Seminars...

Our balancing seminar program is designed to give both maintenance and manufacturing personnel the opportunity to learn new concepts, and improve skills. Our close relationship with the balancing committees of the ISO, ANSI, SAWE, SAE, and SME provide students with the most recent practices and procedures. "Universal theories," applicable to all balancing machines, are presented in an interactive environment where students can discuss particular problems and experiences. Hands-on sessions are

service BULLETIN

OBSOLETE BALANCING INSTRUMENTS

"Obsolete Balancing Instruments" refers to electronic balancing equipment and products for which replacement components are no longer available. Non-availability of replacement parts usually occurs five to ten years following discontinuation of a product.

Schenck Trebel will continue to support all of its equipment, old or new, to the farthest extent possible for as long as such equipment exists.

Schenck Trebel will also always keep the customer's interest paramount. For this reason, we ask that owners of obsolete balancing instruments take note of the following:

Schenck Trebel strongly recommends that evaluation or repair of obsolete instruments be performed at the customer's site rather than being sent to Schenck's facilities. This is to avoid potential shipping damage to irreplaceable components.

Due to limited availability of replacement parts, repair efforts on obsolete electronics are usually limited to adjustments to existing components. These components are sometimes so fragile from age that they may no longer be adjustable, or may be irreparably damaged during such adjustments.

New replacement instruments of current design are available from Schenck Trebel for purchase or rental. These may, however, have a lead-time incompatible with a customer's production needs should an existing obsolete instrument abruptly fail. Owners of obsolete instruments should weigh the risk posed by potential extended downtime of their balancing operations. Such risk may warrant investment in a new instrument before such failure occurs.

These points should always be taken into consideration before considering further investment in an obsolete instrument.

used frequently to reinforce theory and practice the skills that have been learned.

All seminars can be tailored to meet your specific requirements and presented at your facility!

Please see the back cover for the 2001 Seminar Schedule. Use the reply card on the last page to request the 2001 Balancing Seminar Program and for more information concerning STC Products and Services.

Safety Hold-Downs & Negative Load Bearings

Important features for operator safety!

by Joseph Alberto,
Product Manager, Universal Balancing Machines

Schenck balancing machines are designed to meet or exceed the most demanding balancing requirements with established, safety conscious operational techniques. As part of that commitment, all Schenck horizontal balancing machines are equipped with safety hold-downs and/or negative load bearings, an important feature when specifying new equipment. These devices will contain the rotor in the balancing machine in the event the rotor changes its balance state while running at balancing speed or during acceleration to the balancing speed.

To further enhance these most important safety devices, Schenck has integrated a damping feature which will prevent potential operator injury when closing the device. These pistons prevent the arms from slamming shut, and allow them to slowly lower to the closed position. On larger machines, this feature also greatly reduces damage and operator fatigue.

When balancing rotors whose center of gravity is between the supports, the following steps should be followed to properly secure the safety devices:

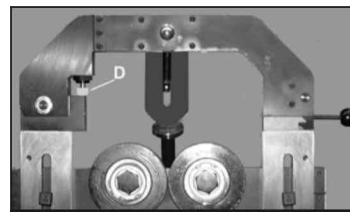
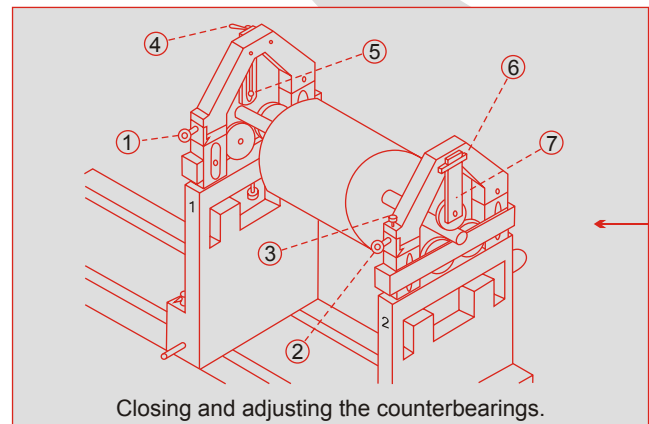
Using the Safety Hold Down (5):

- Close the safety hold down. Make sure that the safety device (1) is secured in position.
- Adjust the friction element (5) of the safety hold down by loosening the clamping lever (4).
- Adjust the friction element (5) in such a way that there is a gap between the rotor journal and the friction element. The gap should be approximately $\frac{1}{4}$ " to $\frac{1}{2}$ " depending on the size of the rotor.
- Retighten all loosened screws and clamping levers.

Using the Negative Load Bearing (7):

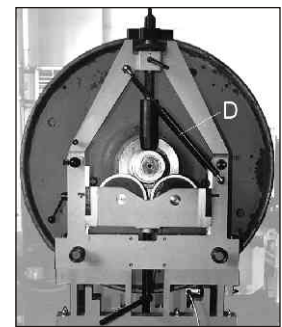
- Close the negative load bearing. Make sure that the safety device (2) is secured. Fix the safety device (3).
- Adjust the roller (7) of the negative load bearing by loosening the screws (6).
- Adjust the distance between the roller (7) and the journal in such a way that the roller is very close to the journal (about $\frac{1}{4}$ ") without touching with it. Retighten all loosened screws and clamping levers.

Please contact our help desk if there are any questions regarding a rotor's negative load or the negative load limits of a Schenck balancing machine. We would be happy to review these important issues with you to promote safety as well as supply the right product for the job.



▲ For machine sizes H2-H40 (250 lb. to 6,500 lb. capacity), a built-in damper (D) is used.

The built-in damper on machine ► sizes H5-H80 (12,000 lb. to 100,000 lb. capacity), is achieved using one or two air damper springs (D).



When balancing rotors whose center of gravity is outside of the supports, thus inducing a negative load on one support, the following steps should be followed using the negative load bearing:

Adjust the negative load bearing in such a way that:

- Both support rollers make contact with the rotor
- The support rollers are loose enough to be manually turned relative to the rotor.
- The admissible upward force acting on the negative load bearing is not exceeded.

The contact between the journals and the twin roller carriages is necessary for proper measurement of the unbalance. Do not exceed the admissible upward force acting on the negative load bearing. In case of doubt, measure it by using a force measuring device or calculate the negative load based on the location of the center of gravity of the rotor and the respective location of the bearing supports. If the admissible upward force is exceeded, the rotor could destroy the negative load bearing or become uncontrollable causing possible injury to the operator, as well as damage to the balancing machine.

The Schenck Help Desk...



Our Help Desk provides our customers with immediate answers to application-related questions. It is designed to be a liaison between sales, service and engineering to address technical issues about the products that we offer. If you have application-related questions for the Help Desk, call us at 1-800-873-2352, or visit us online at www.schenck-usa.com/helpdesk. Here's what some of you have been asking about:

Why is the minimum rotor weight for hard-bearing balancing machines not specified?

Hard-bearing machines are classified as centrifugal force measuring machines. Generally, if the machine sensitivity specification can meet the rotor's tolerance requirement, then it is feasible for balancing. Therefore, unbalance measurement is still possible regardless of the rotor weight, provided that the centrifugal force of unbalance is accurately transmitted to the machine supports. Inaccurate force transmission is normally manifested by unstable/fluctuating unbalance measurement exceeding the rotor's unbalance tolerance. (Note: it is assumed that the minimum requirements for journal diameter, distance between bearing planes and driven diameter have been met, and that the rotor physically fits within the machine's rotor parameters.)

Is it necessary to isolate a hard-bearing machine foundation from the rest of the shop floor?

No. All hard-bearing machines require a rigid foundation to effectively convert the centrifugal force of unbalance to dynamometer spring deflection. Isolating the machine foundation is possible, but will require more seismic mass to provide the resistance/rigidity necessary for a particular machine size.

What about the effect of vibration from other machines on the same floor?

A good balancing instrumentation can filter out any external vibrations that may occur at frequencies other than at balancing speed. Of course, there have been some extreme instances where the external vibrations have exceeded the filtering capabilities of the instrument, or the external vibrations were strong enough to cause the rotor to be mechanically unstable in its bearings, but these are extremely rare cases.

We use reference document ARP 1340 & ARP 1342 to calibrate our balancing machine. In September of 1989, both documents were canceled by SAE. Can you give us another document with the calibration procedure for our balancing machine? What is a hard-bearing two-plane balancing machine with permanent calibration?

You might consider reviewing the SAE document ARP4048 "Balancing Machines - Description And Evaluation, Horizontal, Two plane, Hard-Bearing Type for Gas Turbine Rotors" for horizontal balancing machines. If you are utilizing vertical balancing machines see SAE ARP4050 "Balancing Machines - Description and Evaluation Vertical, Two-Plane, Hard-Bearing Type for Gas Turbine Rotors." There is also SAE ARP5323 for Vertical single plane hard bearing balancing machines. Please refer to the SAE site www.sae.org and search under "balancing machines" to order your new documents.

The term "hard bearing balancing machine" describes a machine having a balancing speed range below the natural frequency of the suspension-and-rotor-system. The output signal of the sensors of the machine is equivalent to the centrifugal force, generated by an unbalance, independent on the rotor weight. Below the specified maximum rotor weight these types of balancing machines are calibrated for all rotors, regardless of their mass and mass distribution. Another term for "hard-bearing balancing machine" is therefore "permanently calibrated balancing machine." The SAE documents describe test procedures to verify the permanent calibration, not to recalibrate machines.



Please send the following information...

- | | |
|--|-----------|
| <input type="checkbox"/> Hard bearing balancing machines | RM1001e |
| <input type="checkbox"/> Balancing of small and light rotors | RM1002e |
| <input type="checkbox"/> CAB 690 (hard bearing machines) | RC1006e |
| <input type="checkbox"/> CAB 690R (soft bearing machines) | A1140e |
| <input type="checkbox"/> CAB 720 (hard & soft bearing machines) | RC1004e |
| <input type="checkbox"/> CAB 700 (hard bearing machines) | RC1007e |
| <input type="checkbox"/> Vertical balancing machines | RM1110e |
| <input type="checkbox"/> Vertical (modular) balancing machines | RM1025e |
| <input type="checkbox"/> Spin test systems | RT1117e |
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| <input type="checkbox"/> Balancing solutions - aeronautical & gas turbines | RL1002e |
| <input type="checkbox"/> Toolholder balancers | RM2517e |
| <input type="checkbox"/> Balancing machines/portable (elec motor repair) | 951201 |
| <input type="checkbox"/> Rotor and machine enclosures | STC89401 |
| <input type="checkbox"/> Portable analyzers/field balancer-Series 40 | C1341e |
| <input type="checkbox"/> Portable analyzers/field balancer-Series 60 | BBF-0009e |
| <input type="checkbox"/> Vibro-IC machine monitor | BV-P1005e |
| <input type="checkbox"/> Vibration monitors - multi-channel | C1344 |
| <input type="checkbox"/> Vibration monitors - VC920 | C1339e |
| <input type="checkbox"/> Vibration monitors - VC920 | 961101e |
| <input type="checkbox"/> Vibration sensor catalog | BV-P1001e |
| <input type="checkbox"/> Sheave alignment system | S-600 |
| <input type="checkbox"/> Laser alignment system | S-650 |
| <input type="checkbox"/> 2001 Balancing seminar program | |

Have a sales engineer contact me.

^NAME

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2001 Seminar Schedule

For more information on our seminars, request the 2001 Balancing Seminar Program on the Reply Card.

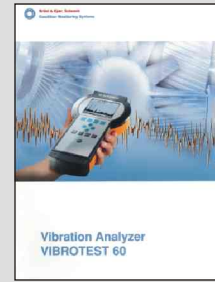


- Fundamentals of Balancing**
.....June 19-21, 2001, Atlanta, GA
- Balancing Theory & Applications I**
.....August 28-30, 2001, Deer Park, NY
- Vibration Analysis, Field Balancing, & Alignment**
.....September 4-6, 2001, Houston, TX
- Fundamentals of Balancing**
.....September 11-13, 2001, Chicago, IL
- Balancing Theory & Applications II**
.....October 2-4, 2001, Deer Park, NY
- Balancing Theory & Applications I**
.....November 6-8, 2001, Phoenix, AZ
- Vibration Analysis, Field Balancing, & Alignment**
.....November 27-29, 2001, Pittsburgh, PA
- Fundamentals of Balancing**
.....December 4-6, 2001, Deer Park, NY

New Literature



CAB 700 # RC 1007e
The CAB 700 is a microprocessor-based unit that offers powerful correction features and a variety of diagnostic functions in a user-friendly format. This small, rugged instrument is the perfect instrument upgrade for universal applications.



Vibrotest 60 # BBF 0009
Recently updated for our new Field Balancing Module, this handy instrument combines the latest vibration analysis and field balancing programs for outstanding field diagnostic capability.



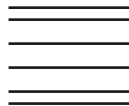
Tooldyne SV # RM2517
Schenck's Tooldyne SV can quickly identify and correct the unbalance conditions in tools and toolholders that lead to vibration, chatter, poor surface finishes and spindle-bearing wear. The Tooldyne SV comes with PC-based balancing software, a quick-change clamping system, and it accommodates CAT, BT and HSK tooling.



Modular Vertical Machines # RM 1025e
The new design of our modular vertical machines offers maximum flexibility for disk shaped rotors. Modules for shrouds, drive power and drill correction devices can be integrated to meet the needs of any application, and configured with a variety of CAB instrumentation packages.

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